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IS 10806 (2003): Trailers for Power Tillers [FAD 21: Farm Implements and Machinery]

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पावर टिलर के लिए ट्राली — विशिष्टि  
( पहला पुनरीक्षण )

*Indian Standard*

TRAILERS FOR POWER TILLERS — SPECIFICATION  
( *First Revision* )

ICS 65.060.10

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BUREAU OF INDIAN STANDARDS  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

## FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Farm Implements and Machinery Sectional Committee had been approved by the Food and Agriculture Division Council.

Trailers are used with power tillers for transportation purposes. In order to provide guidelines for manufacture of quality trailers, a need was felt to prepare this standard.

This standard was first published in 1984 and it has been revised due to following reasons:

- a) To enlarge the scope by incorporating the requirements of IS 10807:1984 'Specification for axles with brakes of trailer for power tillers.'
- b) To modify constructional requirements.
- c) To update the standard.

The figures given in the standard are intended to serve only as illustrations and should not be considered as suggestive of any standard design.

In preparation of this standard due attention has been taken from JIS B 9207-1977 'Trailers for power tiller' published by the Japanese Standards Association.

The dimensions of the trailer and its accessories shall not, in any way, infringe the rules and regulations of the Local Transport Authority in force from time to time.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## Indian Standard

# TRAILERS FOR POWER TILLERS — SPECIFICATION

## (First Revision)

### 1 SCOPE

This standard specifies material, dimensions and other requirements for trailers for power tillers.

### 2 REFERENCES

The following Indian Standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title	IS No.	Title
210 : 1993	Grey iron castings ( <i>fourth revision</i> )	7201 : 1987	Method of sampling for agricultural machinery and equipment : Part 1 Hand tools and hand operated/ animal drawn equipment
617 : 1994	Aluminium and aluminium alloy ingots and castings for general engineering purposes ( <i>third revision</i> )	7283 : 1992	Hot rolled bars for production of bright bars and machined parts for engineering applications ( <i>first revision</i> )
816 : 1969	Code of practice for use of metal arc welding for general construction in mild steel ( <i>first revision</i> )	7904 : 1995	High carbon steel wire rods ( <i>first revision</i> )
1135 : 1995	Springs leaf springs assembly for automobiles ( <i>fifth revision</i> )	8213 : 2000	Agricultural trailer ( <i>second revision</i> )
1875 : 1992	Carbon steel billets, blooms, slabs and bars for forgings ( <i>fifth revision</i> )	9821 : 1981	Glossary of terms related to farm transport equipment
2062 : 1999	Steel for general structural purpose ( <i>fourth revision</i> )	9942 : 1981	T-Sign plate for trailers
2742 (Part 1) : 1994	Automotive vehicles — brake linings: Part 1 Specification ( <i>first revision</i> )	11270 : 1985	Ring type hitches for agricultural trailers
2831 : 2001	Carbon steel billets, blocks and slabs for rerolling into steel for general structural purposes ( <i>second revision</i> )		
3628 : 1966	Sidelights, tail-lights, parking lights, stop lights and direction indicators for automobile use		
3601 : 1984	Steel tubes for mechanical and general engineering purposes ( <i>first revision</i> )		
4000 : 1992	High strength bolts in steel structures — Code of practice ( <i>first revision</i> )		
4060 : 1994	Flashers for direction indicators for automobiles ( <i>first revision</i> )		
4454 : (Part 1) 2001	Steel wires for cold formed springs: Part 1 Patented and cold drawn steel wires — Unalloyed ( <i>second revision</i> )		
5129 : (Part 1) 2000	Rotary shaft radial lip type oil seal units: Part 1 Dimensions ( <i>second revision</i> )		

### 3 TERMINOLOGY

For the purpose of this standard, definitions given in IS 9821 and IS 8213 shall apply.

### 4 NOMENCLATURE

For the purpose of this standard, the nomenclature of various parts shall be as given in Fig. 1, 2 and 3.

### 5 MATERIALS

The material for axle assembly shall be as given in Annex A. The material for some of the important components of trailers shall be as given in col 3 of Table 1. The material may conform to the relevant Indian Standard and grade given in col 4 of Table 1.

### 6 CAPACITY

The capacity of a trailer shall be its gross load and shall be 0.5 t, 0.75 t and 1 t. The gross load along with the pay load shall be declared by the manufacturer.

### 7 DIMENSIONS

**7.1** The dimensions given under 7.2 to 7.8 shall not in any way infringe the rules and regulations of the local transport authority.

**7.2** The width of loading platform (*see W<sub>1</sub>* in Fig. 1) shall be maximum of 1 m.

**7.3** The length of loading platform (*see L<sub>1</sub>* in Fig. 1) shall be maximum of 2 m.

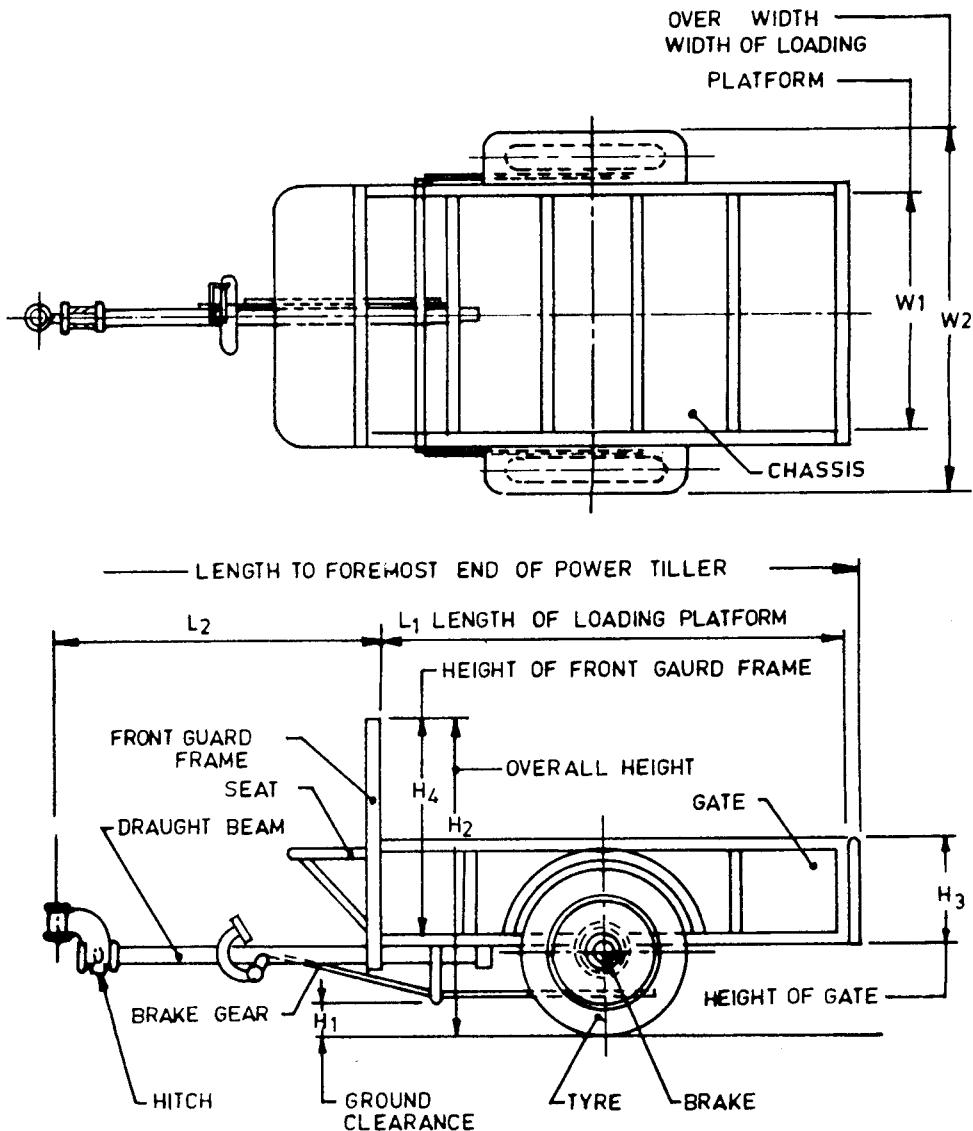


FIG. 1 DIMENSIONS OF TRAILER

Table 1 Material of Construction

(Clause 5)

Sl No.	Components	Material	Applicable IS	Sl No.	Components	Material	Applicable IS
(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
i)	Chassis	Mild steel	IS 2062	xiv)	Hand brake lever handle	Mild steel Carbon steel	IS 2062 IS 3601
ii)	Gate	do	do	xv)	Hand brake lever pawl release	do	IS 2602
iii)	Front guard frame	do	do	xvi)	Hand brake lever pawl	do	IS 7904
iv)	Seat support	do	do	xvii)	Hand brake ratchet	Mild steel	IS 2831
v)	Draught beam	do	do	xviii)	Pawl spring	Spring steel	IS 2062
vi)	Hitch	Malleable cast iron	IS 14329	xix)	Hand brake base plate	Mild steel	IS 4454 (Part 1)
vii)	Platform	Carbon steel	IS 1875	xx)	Hand brake lever	do	IS 2062
viii)	Brake pedal	Mild steel	IS 2062	xxi)	Hand brake link	do	do
ix)	Pull rod	do	do	xxii)	Hand brake pull rod	do	do
x)	Lever	do	do				
xii)	Adjusting nut	do	do				
xiii)	Joint block	Carbon steel	IS 2831				

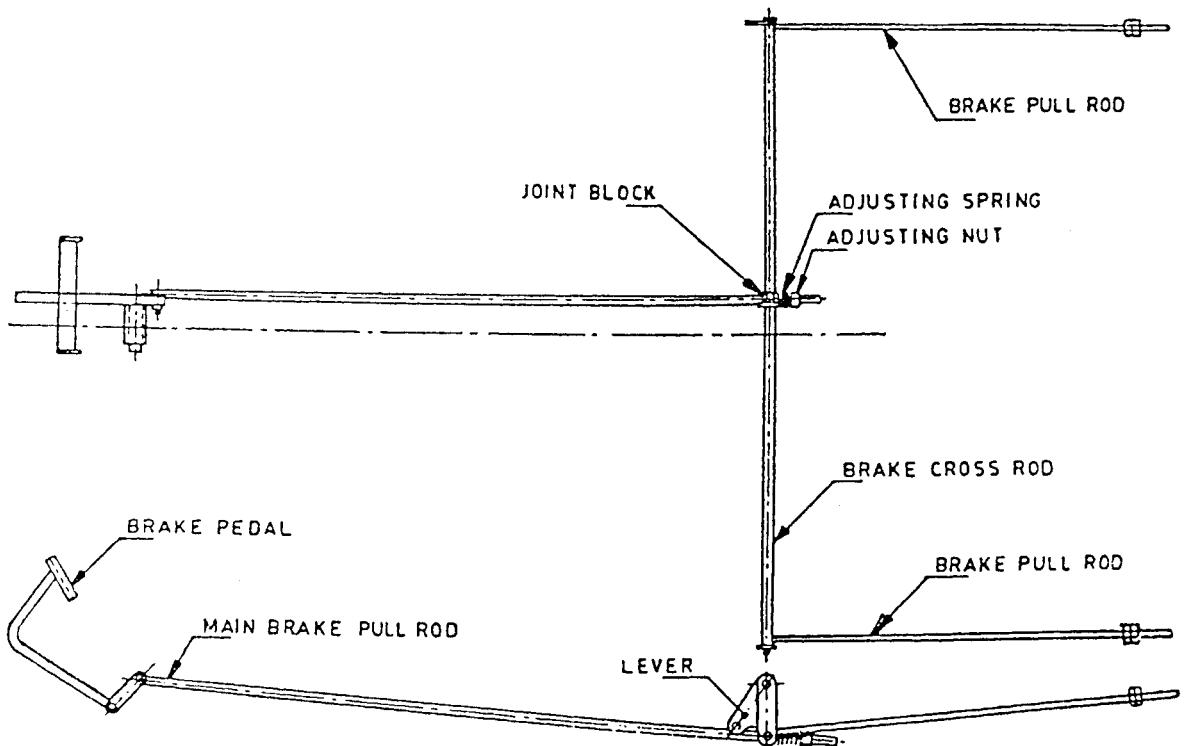


FIG. 2 SERVICE BRAKE GEAR

7.4 The distance between the centre of hitch to the front guard frame (see  $L_2$  in Fig. 1) shall be maximum of 1.5 m.

7.5 Overall width (see  $W_2$  in Fig. 1) shall be maximum of 1.7 m.

7.6 Ground clearance (see  $H_1$  in Fig. 1) shall be minimum of 150 mm.

7.7 Overall height ( $H_2$  in Fig. 1) shall be maximum of 2 m.

7.8 Length to foremost end of power tiller may be maximum of 4.7 m.

## 8 CONSTRUCTIONAL REQUIREMENTS

8.1 The loading platform may be plain and provided with hinged or fixed side boards.

8.2 The trailers shall be provided with lashing hooks for tying down the load.

8.3 For single-axle trailer, tow eye of the drawbar or hitch of the trailer, when fully loaded may be parallel to the level surface after hitching with towing power tiller. For balanced trailer drawbar or hitch of the trailer shall be of hinged type so that load from trailer is not transferred to the towing power tiller. In the

towing hitch, a suitable shock absorbing device shall be provided. The hitch height of trailer should always be below rear axle height of the power tiller.

8.4 Tow eye of the trailer shall be capable of rotating at 360° angle to take on even rigid trailer hook of the towing power tiller. Ring type hitches shall conform to IS 11270.

8.5 For balanced trailers, the front axle shall have the capability to swivel to a maximum of 120° (60° on either side) about the vertical axis.

8.6 The trailer shall be fitted with pneumatic tyres and rims as recommended by Indian Tyre and Technical Advisory Committee (ITTAC), revised from time to time.

8.7 The axle(s) shall conform to requirements given in Annex A.

8.8 Trailers shall have service brake.

8.9 The trailer shall be fitted with two red coloured reflectors at rear sides and two white coloured reflectors on front sides at a distance not more than 150 mm from extreme ends to the centre of reflectors. The reflectors shall be round with reflecting area for reflectors shall be as per CMVR requirements for agricultural tractor/trailer.

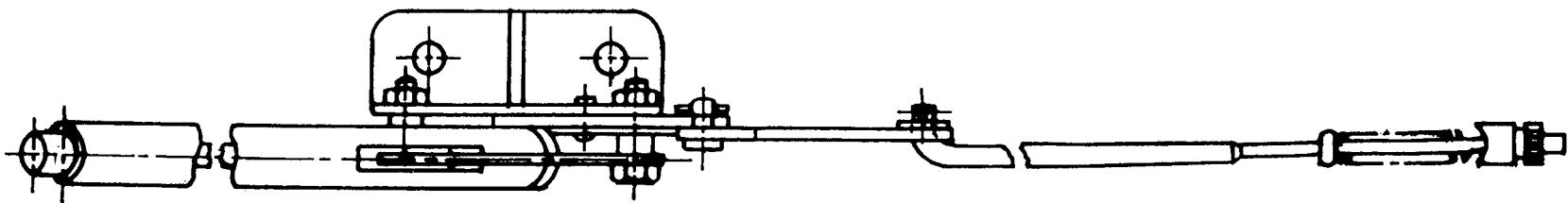
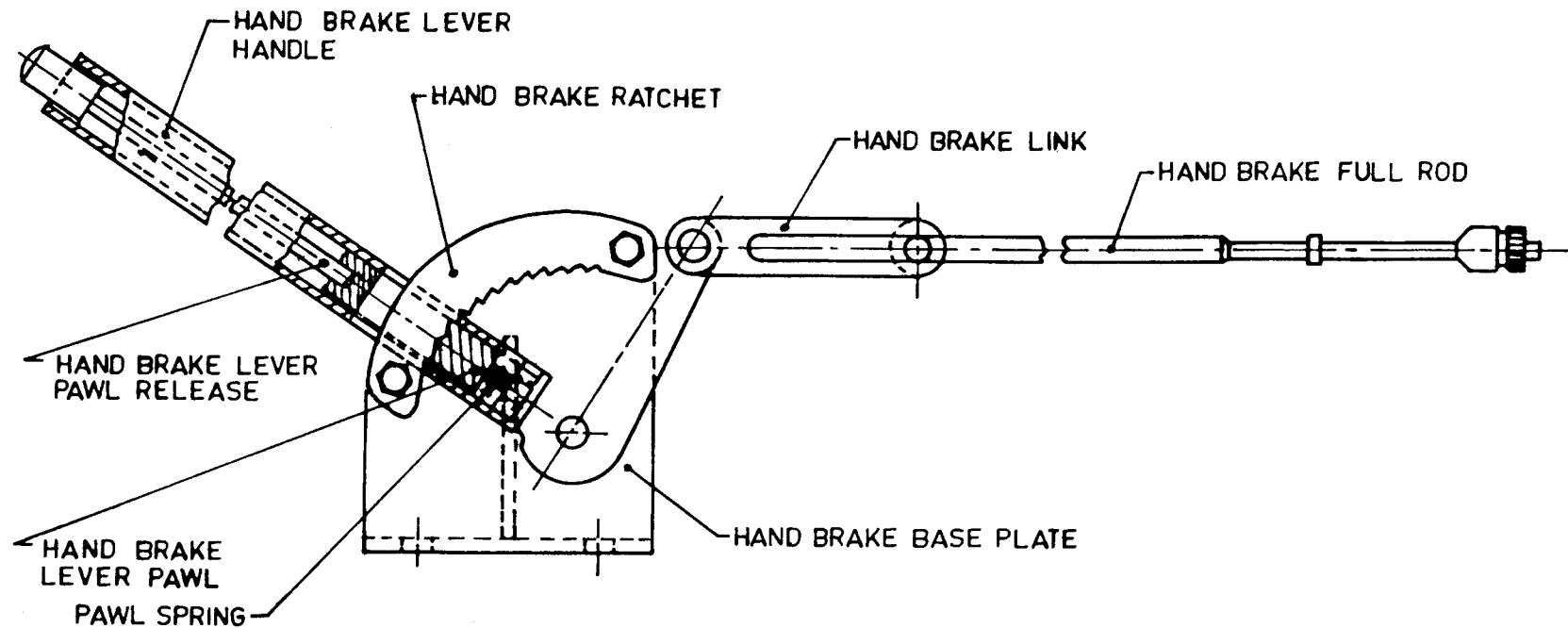


FIG. 3 PARKING BRAKE GEAR

## 9 PERFORMANCE

**9.1** When the trailer is loaded with 300 kg, load on seat and the recommended pay load nearly uniformly distributed on the loading platform, while statically supported at hitch with the draught beam horizontal, no breakdown or defect shall develop in any part.

**9.2** When the break pedal is applied with a pedal pressure of 500 N, the torque generated on each brake cam shaft shall be not less than 80 N.m.

**9.3** When the brake pedal is applied with a pedal pressure of 1 kN no breakdown shall occur in any part.

**9.4** The brake gear shall be able to stop the running trailer, nearly uniformly loaded with its pay load on the loading platform, connected to a suitable power tiller with a stopping distance not more than 5 m from 15 km/h initial speed on a dry horizontal paved road and shall be able to safely stop and maintain the trailer with the same load, on a slope of 12°.

## 10 WORKMANSHIP AND FINISH

**10.1** All sharp edges and corners shall be removed.

**10.2** Castings and forgings shall be clean and free from all visual defects.

**10.3** Welding shall not be porous. As far as possible, it should be done in accordance with IS 816.

**10.4** The surfaces which have been treated for anti-corrosive shall be free from defects such as wrinkle, unevenness and scars.

## 11 MARKING

**11.1** The trailer shall be marked with the following particulars:

- a) Manufacturer's name and registered trademark, if any;
- b) Gross load and pay load; and
- c) T-sign at the rear (see IS 9942).

### 11.2 BIS Certification Marking

The trailer may also be marked with the Standard Mark.

**11.2.1** The use of the Standard mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## ANNEX A

(Clause 8.7)

## REQUIREMENT OF AXLE WITH BRAKES OF TRAILER FOR POWER TILLERS

## A-1 NOMENCLATURE

The nomenclature of various parts shall be as given in Fig. 4.

## A-2 CLASSIFICATION

The axles with brakes shall classified in two classes: Class 1 and Class 2, according to the class of brakes.

## A-3 MATERIAL

The material for various components of the axle with brake shall be as given in col 3 of Table 2. The material may conform to the relevant Indian Standard given in col 4 of Table 2.

## A-4 DIMENSIONS

The dimensions when read in conjunction with Fig. 5 shall be as given in Table 3.

## A-5 METHOD OF TESTING BRAKE TORQUE

## A-5.1 Testing Machine

The testing machine shall be made of a static brake testing machine equipped with one spiral scale as shown in Fig. 6.

## A-5.2 Method

Firmly bind the brake on the testing machine and place the mass  $W$  suitable for applying a torque of 80 N.m on the brake cam shaft. Adjust the position of the angle adjusting stand so that the tension acts on the brake cam shaft lever always perpendicular to it. At this time bring the position of the torque arm to point  $a$ . Read the indication of the spiral spring scale (A), while the torque arm is moving from the point  $a$  to the point  $a'$  by the operation of the torque handle. Read the load on the load/strain diagram. Take the product of this load and the length of the torque arm as the statical braking torque.

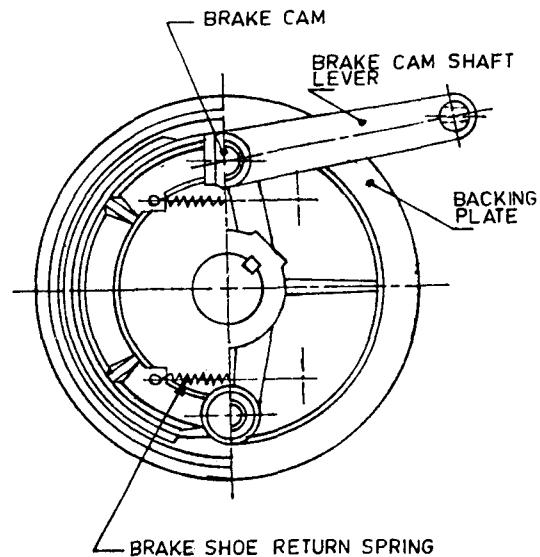
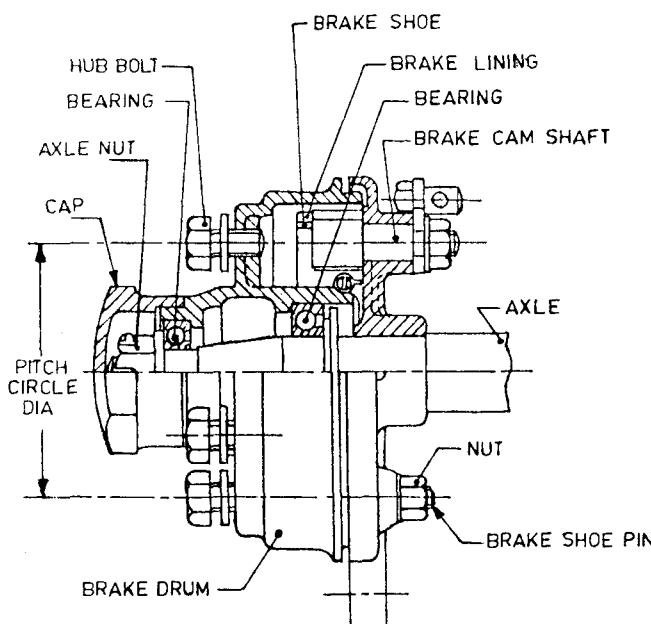


FIG. 4 NOMENCLATURE OF AXLE ASSEMBLY

**Table 2 Material of Construction of Various Components of Trailer Axles**  
(Clause A-3)

Sl No.	Components	Material	Applicable IS
(1)	(2)	(3)	(4)
i)	Brake drum	Cast iron Steel	IS 210 IS 2062
ii)	Backing plate	do	do
iii)	Brake shoe	Cast iron Steel Cast aluminium	IS 210 IS 2062 IS 617
iv)	Brake cam shaft	Carbon steel	IS 7283
v)	Brake shoe pin	do	do
vi)	Axle	do	do
vii)	Hub	Cast iron	IS 210
viii)	Dust cover/Cap	Mild steel	IS 2062

#### A-6 OTHER REQUIREMENTS

**A-6.1** Brake lining shall conform to IS 2742 (Part 1).

**A-6.2** The axle assembly shall be able to maintain wheel track of 1 200 mm, 1 350 mm or 1 500 mm.

**A-6.3** The brake drum shall be able to rotate smoothly without slackening when testing with the axle fitted.

**A-6.4** The radial deflection of the brake shall be not more than 0.3 mm on the wheel fitting part of the brake drum and the lateral deflection not more than 0.3 mm on a circle near the pitch circle of hub bolts.

**A-6.5** The brake lining shall be firmly fixed on the brake shoe.

**A-6.6** Assembly particularly inside of the brake shall be leak and dust proof. Oil seals [see IS 5129 (Part 1)] and gaskets should be provided.

**Table 3 Dimensions of Axle with Brake**  
(Clause A-4)

Sl No.	Characteristics	Dimensions for Class of Axles		Ref to Symbol in Fig. 5
		Class 1	Class 2	
(1)	(1) Hub bolt pitch circle diameter, mm	$120 \pm 0.3$	$120 \pm 0.3$	(5) A
i)	Brake drum and wheel fitting dimension, mm	$80^{+0}_{-0.2}$	$80^{+0}_{-0.2}$	B
ii)	Inside diameter of brake drum facing brake lining, mm	$150^{+0}_{-0.2}$	$175^{+0}_{-0.2}$	C
iii)	Total area of lining for one brake, $\text{cm}^2$	60 Min	70 Min	—
iv)	Outside diameter or width across flats of axles, mm	28 Min	32 Min	D

<sup>(1)</sup> Recommended dimensions.

**A-6.7** The hub shall be packed with multi purpose grease between the bearings. A grease nipple (see IS 4000) should preferably be provided.

**A-6.8** No oil shall leak on the friction surface of the brake lining.

#### A-7 DESIGNATION

The axle shall be designated by the number of this standard, class and the track width.

*Example*

An axle assembly of Class 1 and for wheel track 1 200 mm shall be designated as:

Axle 1 × 1 200 — IS 10806

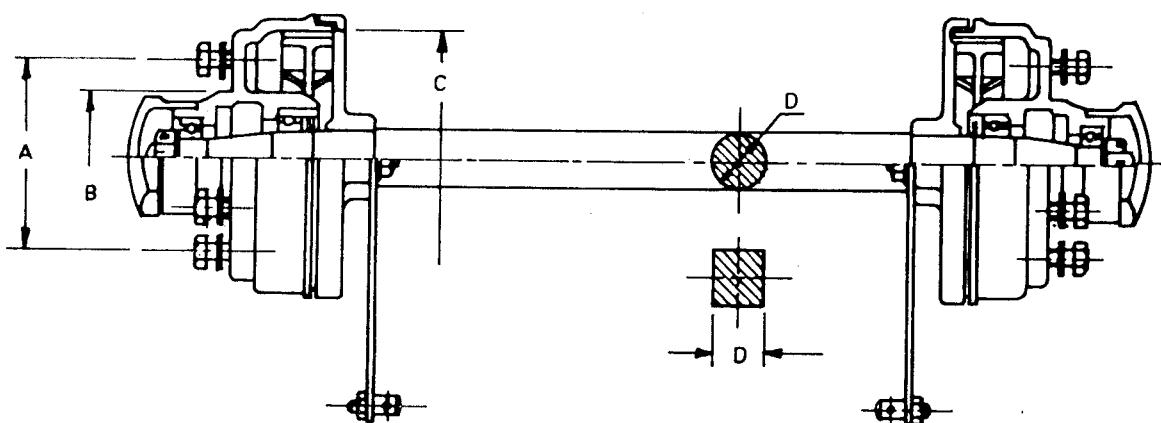


FIG. 5 DIMENSIONS OF AXLE

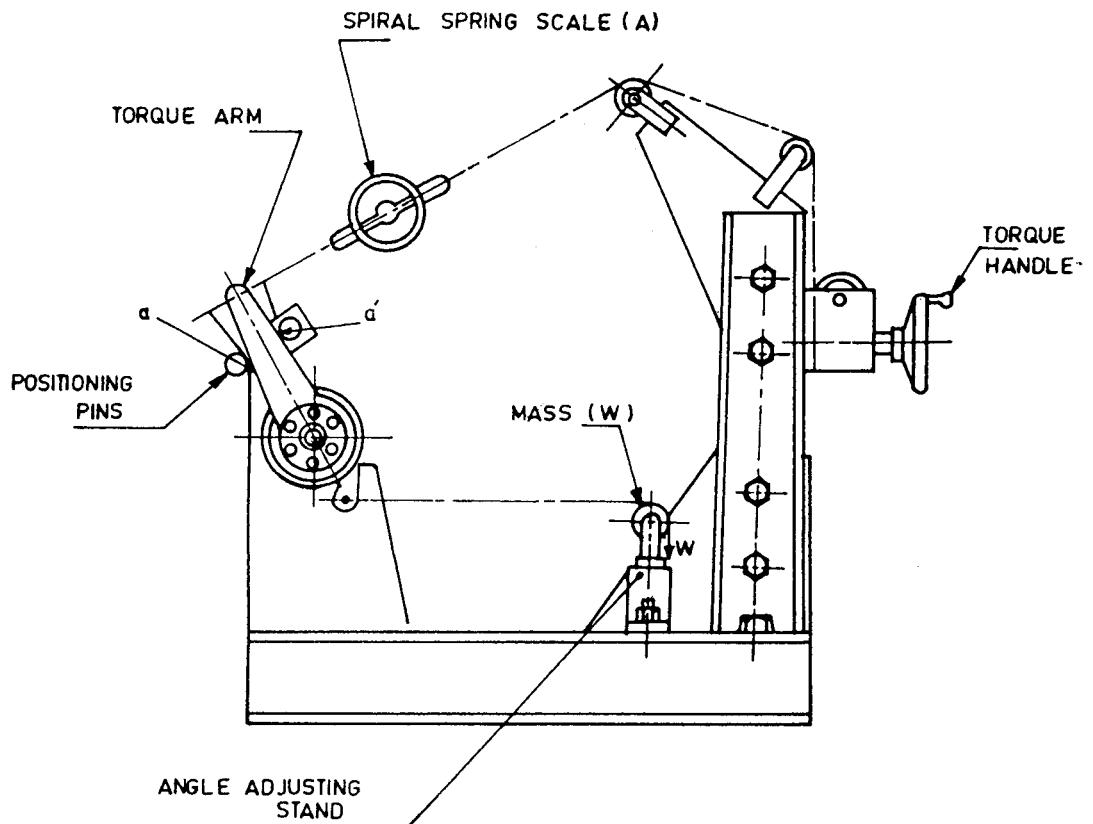


FIG. 6 TYPICAL BRAKE TESTING MACHINE

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc : No. FAD 59 (694).

### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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